



TVA's Integrated River System

JOHN J. McCORMICK, JR.

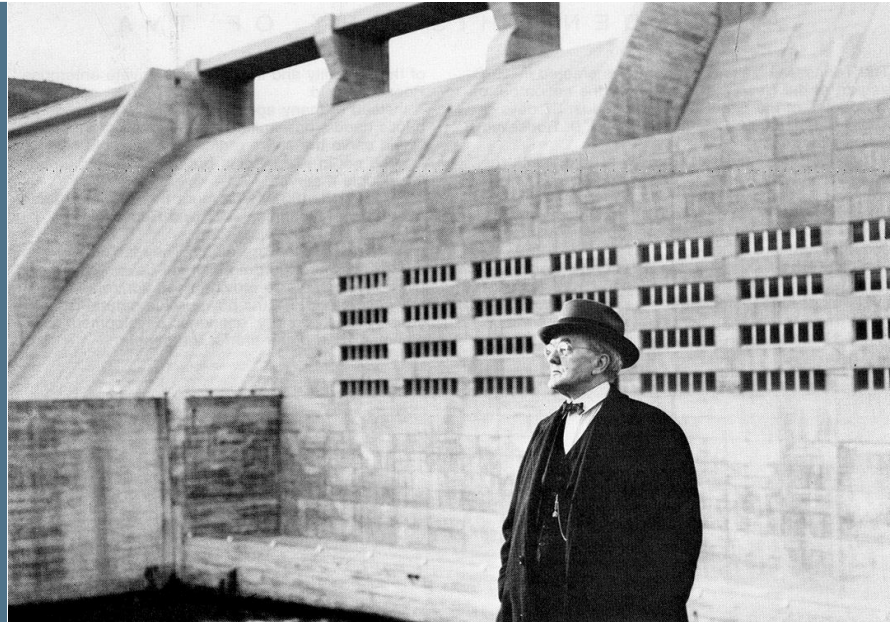
Vice President, Safety, River Management and Environment

April 22, 2015

Integrated Resource Management

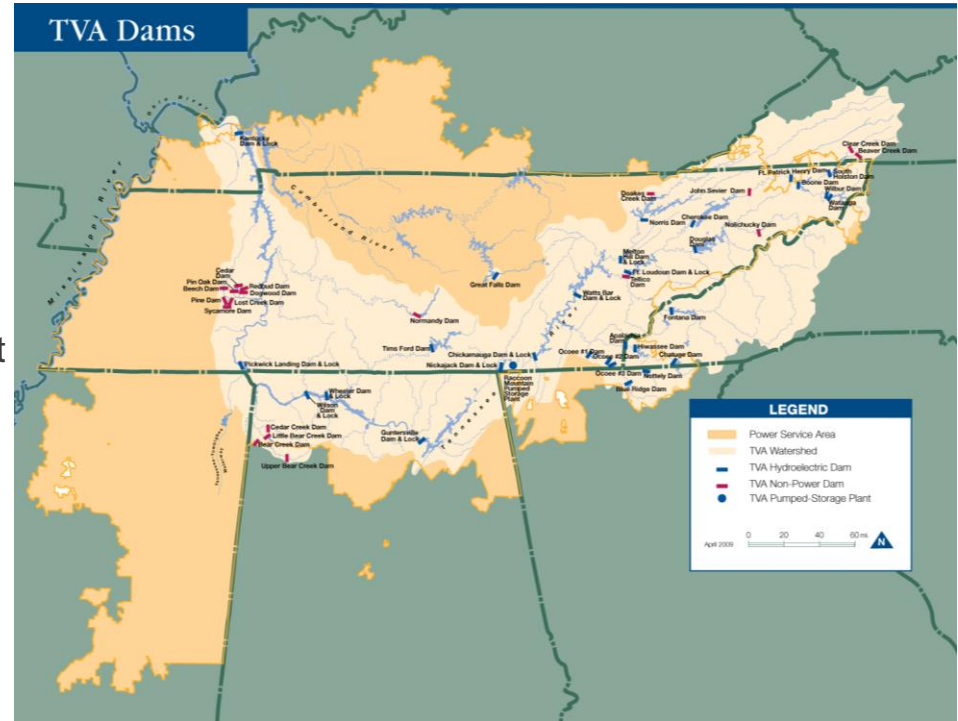
River system assigned multipurpose role through TVA Act in 1933

(section 9a) ...to regulate the stream flow primarily for the purposes of promoting navigation and controlling floods. So far as may be consistent with such purposes, ...for the generation of electric energy...



TVA Power Service Area

- 80,000 square mile power-service area
- 41,000 square mile watershed
- 16,000 miles of transmission line
- Diverse power supply
 - 29 conventional hydroelectric plants
 - 1 pumped storage hydroelectric plant
 - 10 coal-fired plants
 - 3 nuclear plants
 - 5 combined cycle plants
 - 9 CT sites
- 155 local power companies
- 59 direct-serve customers



Integrated Tennessee River System

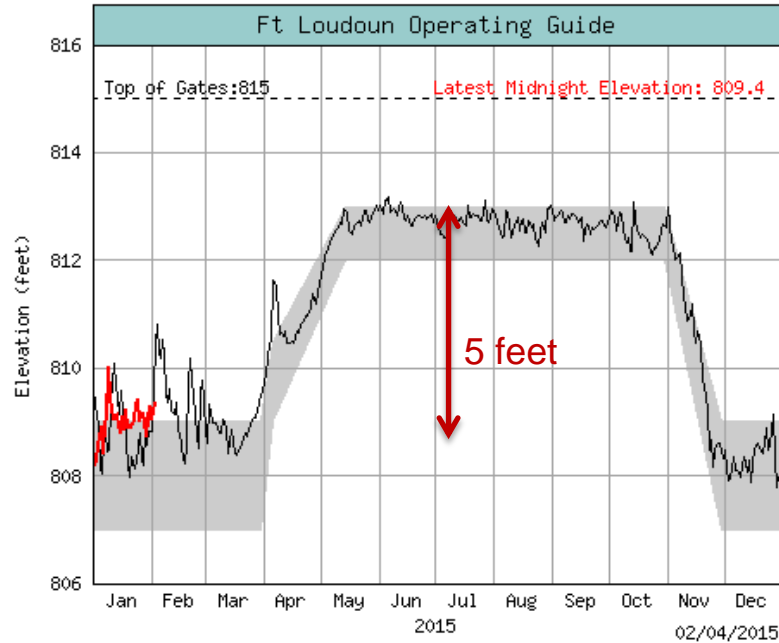
Balancing Competing Demands and Optimizing Multiple Benefits

- TVA has a long history that began with its river management mission
- Operations are driven by rainfall and runoff as guided by Reservoir Operations Policy
- Integrated operation allows TVA to balance river system benefits:
 - Navigation
 - Flood-damage reduction
 - Affordable and reliable electricity
 - Improved water quality
 - Dependable water supply
 - Recreation
 - Dam safety

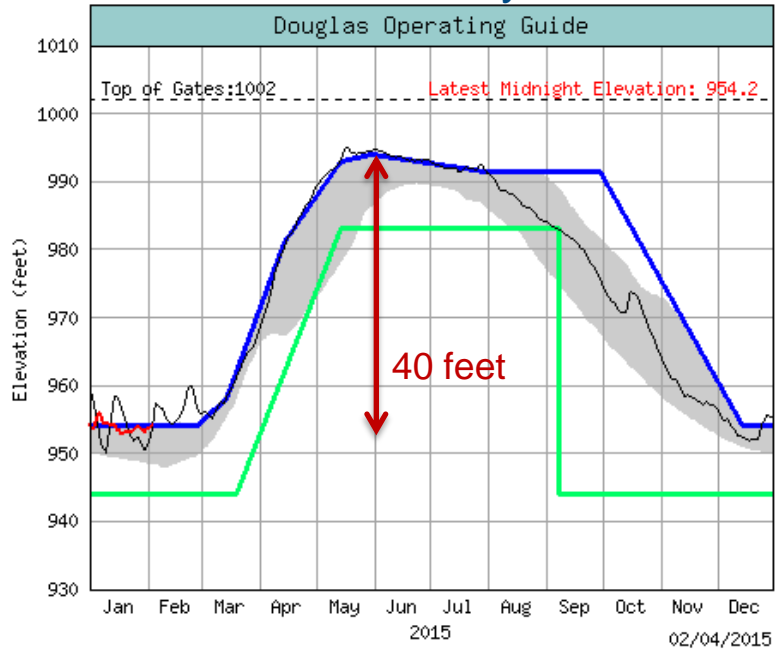


Reservoir Operating Guides

Main River



Tributary



Flood Damage Reduction



- Maintain flood-storage allocation
- Store water during flood to reduce crest
- Issue flood forecast for regulated streams
- Release water at non-flood rate after crest
- All downstream riparian areas receive some flood-reduction benefits
- Annual average flood damages averted are nearly \$260 million (\$6.8 billion to date)

Navigation



- 11-foot navigation channel for a 9-foot draft vessel
- Power for lock operations
- Partnership with U.S. Army Corps of Engineers for lock maintenance and capital improvements
- Navigation aids on secondary and recreational channels

Benefits

- Annual savings to shippers: \$500 million
- Annual savings to rail users: \$500 million (water-compelled rates)
- Passage for 18,000 recreational boats
- Removes the equivalent of two million truck loads from the nation's highways and railroads, reducing environmental impacts, road damage, and public safety hazards

Affordable and Reliable Electricity

- Conventional generating capacity (109 units): 3,538 megawatts
- Pumped-storage generating capacity (4 units): 1,653 megawatts
- Manage hydroelectric assets
- Develop daily/hourly operating plans for the hydro system to meet operating objectives while optimizing hydro value
- Benefits include:
 - Peaking power
 - Ancillary services
 - Low forced outage rate
 - Low fuel handling costs
 - Clean, renewable energy source



Thermal Compliance



- Schedule flows to minimize thermal plant derates due to river temperatures
- Benefits include:
 - Avoid National Pollutant Discharge Elimination System (NPDES) discharge permit violations
 - Reduce number and duration of derate occurrences
 - Improve generating efficiency of thermal plants
 - Optimize the use of cooling towers

Water Supply

Reservoirs supply clean and reliable water and a minimum depth for intakes

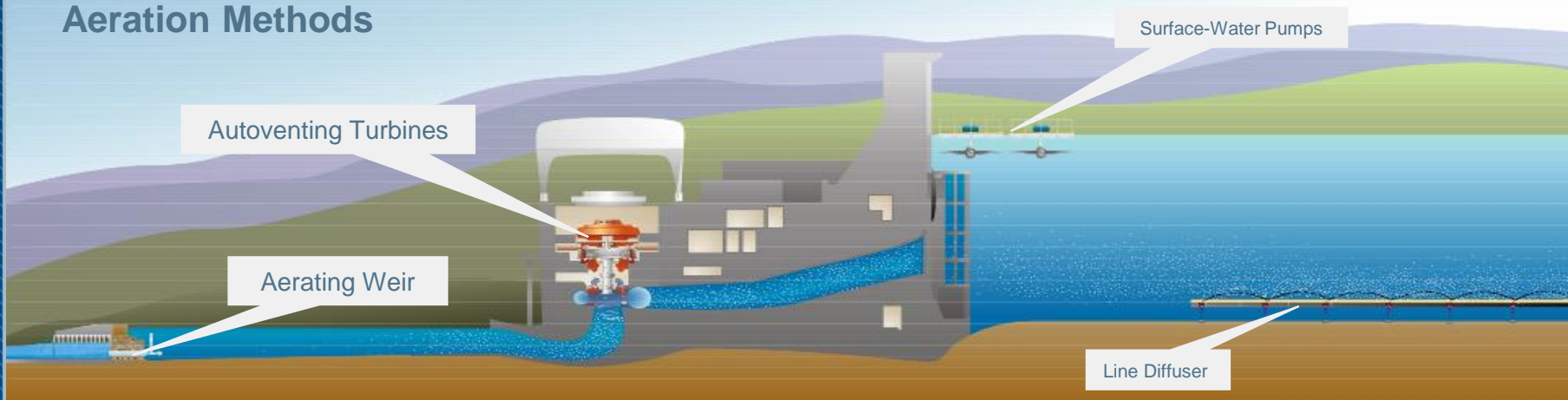
- Ensure that 700 water intakes across the Valley are adequately supplied with water
- Industry supplied with process water and cooling water
- Municipalities supplied with water for household use
- Approximately 4.7 million people depend upon the Tennessee River and its tributaries for drinking water
- Manage flows and releases to provide cooling water for coal and nuclear power plants



Water Quality

- Coordinate with thermal plants to maintain discharge temperature compliance
- Meet dissolved oxygen (DO) targets
- Meet minimum flow targets
- Meet reservoir-specific and system-wide flow for municipal and industrial waste assimilation as well as aquatic habitat
- Monitor water quality conditions

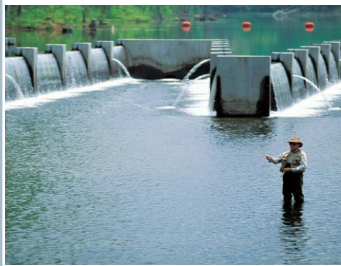
Aeration Methods



Recreation



- Provide summer elevations for reservoir recreation and releases for tailwater recreation
- Restrict the drawdown of tributary reservoirs from June 1 through Labor Day
- Manage winter drawdown to facilitate boat access
- Stabilize reservoir levels during the spring spawn to promote spawning success
- Schedule flows to support special events and activities



Dam Safety

- Ensure operational and structural integrity of water barriers
- Ensure compliance with Federal Guidelines for Dam Safety
- Functions include:
 - Inspection
 - Instrumentation
 - Maintenance and repair of aging structures
 - Emergency action planning



TVA's Mission of Service

TVA's integrated river system is vital to meeting our mission of service

Energy



Provide affordable electric power throughout the Tennessee Valley Region

Environment



Act as a steward of the Valley's natural resources

Economic Development



Serve as a catalyst for sustainable economic development



Appendix



